



Control Number: 45624



Item Number: 322

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SOAH DOCKET NO. 473-16-2751  
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APPLICATION OF THE CITY OF §  
GARLAND TO AMEND A §  
CERTIFICATE OF CONVENIENCE §  
AND NECESSITY FOR THE RUSK §  
TO PANOLA DOUBLE-CIRCUIT §  
345-KV TRANSMISSION LINE IN §  
RUSK AND PANOLA COUNTIES §

BEFORE THE

PUBLIC UTILITY COMMISSION

OF TEXAS

REBUTTAL TESTIMONY

OF

F. PAUL HUDSON

ON BEHALF OF

SOUTHERN CROSS TRANSMISSION LLC

MAY 24, 2016

322<sub>1</sub>

**SOUTHERN CROSS TRANSMISSION LLC  
REBUTTAL TESTIMONY OF F. PAUL HUDSON**

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**I. POSITION AND QUALIFICATIONS**

Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A. My name is Paul Hudson. My business address is Suite 15037, 600 Congress Ave., Austin, TX 78701. I primarily consult to entities with interests in the ERCOT wholesale and retail power market. I provide those services as the founder/co-founder of several different entities.

Q2. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE.

A. For approaching two decades, from a variety of perspectives, I've participated in developing power market policy within the State of Texas. My principle qualifications for testifying in this docket include the following experiences. In 2012, I was appointed by Secretary Chu to serve a two-year term on the Department of Energy's Electricity Advisory Committee. I was subsequently re-appointed by Secretary Moniz to serve out a term completed in 2015.

Prior to entering the private sector in 2008, I was a gubernatorial appointee to the Public Utility Commission of Texas ("Commission"), serving from August 2003 until September 2008 as Commissioner and (during a portion of that tenure) Chair. I have also served sequentially in a variety of other policy roles including Director of Policy and Deputy Director of Policy to the Governor of Texas, Advisor to Commissioner Brett Perlman of the Commission, and as a member of the Commission policy development staff under former Commission Chair Pat Wood.

1           During this tenure, I advised on and was a joint decision maker (with my  
2           fellow Commissioners) on rulemakings and contested cases which assisted in  
3           laying the foundation for Texas' competitive electric market, including certain of  
4           the market rules governing the wholesale electric market within ERCOT.

5           I also signed the order approving Sharyland Utilities application for a  
6           Certificate of Convenience and Necessity (CCN) In PUCT Docket No. 28834 for  
7           a 138-kV transmission line to implement a High Voltage Direct Current  
8           Interconnection with Comision Federal de Electricidad (CFE). For a slightly  
9           more robust description of my professional experience, please see **Exhibit**  
10          **FPH-1-R.**

11  
12   Q3.   HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?  
13          PLEASE DESCRIBE.

14   A.   Yes, once. I prepared testimony in PUCT Docket No. 40953, *Complaint of*  
15          *Johnny H. and Eloise Vinson against Oncor Electric Delivery, LLC* (testifying  
16          before an Administrative Law Judge at the State Office of Administrative  
17          Hearings) on behalf of Oncor Electric Delivery Company, LLC.

18  
19   Q4.   WAS YOUR REBUTTAL TESTIMONY PREPARED BY YOU?

20   A.   Yes, I prepared the rebuttal testimony and the attached exhibits.

1                                   **II.     PURPOSE OF REBUTTAL TESTIMONY**

2    Q5.    ON WHOSE BEHALF ARE YOU TESTIFYING?

3    A.    I am testifying on behalf of Southern Cross Transmission LLC (“Southern  
4           Cross”).

5    Q6.    WHAT IS THE PURPOSE AND SCOPE OF YOUR TESTIMONY?

6    A.    My testimony responds to certain limited aspects of the direct testimony filed by  
7           two intervenors in the docket, *Luminant* and *Texas Industrial Energy Consumers*  
8           (*“TIEC”*), I also respond briefly to the Statements of Position filed by *Texas*  
9           *Competitive Power Advocates (TCPA)* and *NRG*, respectively.

10           In particular, I reject the notion that this docket is an appropriate venue for  
11           the Commission to depart from longstanding policies on cost allocation in relation  
12           to transmission upgrades and ancillary services.

13           Though I generally reject the notion (proffered by TCPA and NRG) that  
14           the addition of this asset somehow creates a “tipping point” in relation to resource  
15           adequacy, my testimony also points out that, should resource adequacy re-assert  
16           itself as an issue at some future date, the Commission has a robust set of tools  
17           with which to address it.

18  
19    Q7.    IN RESPONSE TO INTERVENORS’ TESTIMONY, PLEASE DESCRIBE  
20           YOUR OVERALL PERSPECTIVE REGARDING THIS PROCEEDING?

21    A.    PURA Section 37.056 specifies certain actions the Commission may take upon  
22           receipt of a CCN application. It delineates requirements for consideration in  
23           routing the line -- in particular identifying certain issues as appropriately

1 addressed. In treating routing issues, this proceeding is subject to the well-tested  
2 process and precedent associated with prior Commission review.

3 Unlike other, more typical CCN proceedings however, this filing also  
4 arrives with certain unique characteristics (including statutory treatment) that  
5 allows the Commission to opine on matters that go beyond the difficult process of  
6 transmission line routing. In this proceeding, PURA Section 37.051(c-2)  
7 permissively authorizes the Commission to “prescribe *reasonable conditions* to  
8 protect the public interest that are consistent with the final order of the Federal  
9 Energy Regulatory Commission.”

10 The Commission challenge is determining the appropriate bounds for  
11 those *conditions*, all within a statutorily proscribed timeframe that favors pace,  
12 perhaps over analytical depth.

13 I note, additionally, that (from my perspective) PURA Section 37.051(c-1)  
14 substantially raises the bar for any future interconnection activity of this type,  
15 allowing considerable latitude to the Commission in its range of actions relative to  
16 future potential ties.

17  
18 Q8. PLEASE DESCRIBE HOW YOU PERCEIVE SOUTHERN CROSS?

19 A. Though perhaps notable for the attention it’s received, my perspective is that,  
20 while a DC tie of this magnitude is noteworthy, it’s also fairly pedestrian in light  
21 of the following context:

- 22 • Southern Cross’ physical characteristics are similar to the existing 1250  
23 MW of DC tie transmission capability;

- 1           • Southern Cross is meaningfully analogous to the 2972 MW of switchable  
2           generation on ERCOT's borders;
- 3           • Existing generation stations that well exceed Southern Cross' MW  
4           threshold exist in other geographic locations within ERCOT, for example  
5           the Parish Generating Station is 3565 MW across 4 coal and 4 gas units;
- 6           • When energized, it will join an extraordinarily dynamic mix of existing  
7           generation resources currently projected to be in excess of 87,000 MW of  
8           capacity (across over 500 units), with a projected summer reserve margin  
9           in excess of 20%;<sup>1</sup>
- 10          • ERCOT is currently planning transmission upgrades in excess of \$6  
11          billion over the next 5 years;<sup>2</sup>
- 12          • Currently there are 56,579 MW of total generation capacity under study  
13          within ERCOT, including more than 24,951 MW of wind;<sup>3</sup> and,
- 14          • Since 1999, ERCOT has seen resources come and go – with the  
15          decommissioning of 148 older less efficient units, and investment in  
16          54,710 MW (summer rated) of new, more efficient generation resources.<sup>4</sup>

17          It's this context that supports my agreement with commenters in PUC Project  
18          No. 42647 who suggest a DC tie behaves in like fashion to existing generation

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<sup>1</sup> ERCOT Report on Capacity, Demand and Reserves (CDR) in the ERCOT Region 2017—2026 (May 3<sup>rd</sup>, 2016).

<sup>2</sup> See, for example, Presentation of ERCOT CEO Bill Magness at the ERCOT Market Summit, March 1<sup>st</sup>, 2016.

<sup>3</sup> ERCOT GIS Report, April 2016.

<sup>4</sup> See, for example, ERCOT State of the Grid Report 2015.



resources when importing, and load when exporting.<sup>5</sup> Although the technology and its ERCOT protocol treatment have certain unique attributes, well-established mechanisms exist for reconciling those attributes within the ERCOT stakeholder and, as necessary, the administrative rulemaking process.

While DC tie interconnections with ERCOT merit care, when handled appropriately, they are capable of enhancing reliability, providing new market opportunities for Texas-based generation resources, and providing Texas-based customers with access to a host of new resources.

Q9. DOES YOUR TESTIMONY TAKE A PERSPECTIVE ON THE TYPE OF CONDITIONS YOU CONSIDER REASONABLE UNDER PURA § 37.051(C-2)?

A. No. However, I don't dispute the need to address certain issues that parties have raised in the docket. I haven't exhaustively considered, nor developed such a list.

Q10. HOW DOES YOUR TESTIMONY RELATE TO OTHER WITNESSES PRESENTED BY SOUTHERN CROSS?

A. Southern Cross presents witnesses testifying on power flow models, executive management, engineering, and detailed aspects of PUCT Rules, ERCOT Protocols, and Market Guides. All attempt to answer legitimate questions about the expected operation and treatment of Southern Cross.

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<sup>5</sup> See, for example, the comments of Golden Spread Electric Cooperative, and Luminant Generation.

1 I don't elaborate overmuch on the project itself, instead I try to confine my  
2 testimony to questions of policy and venue as they relate to cost allocation and  
3 competition. While these issues are important to Southern Cross, they also have  
4 potentially broad implications for the ERCOT market and its stakeholders.

5  
6 **III. INTERVENORS' DIRECT TESTIMONY/STATEMENTS OF POSITION**

7 Q11. CAN YOU COMMENT ON BOTH THE PORTIONS OF INTERVENOR  
8 DIRECT TESTIMONY AND THE PORTIONS OF THE STATEMENT OF  
9 POSITIONS WITH WHICH YOU DISAGREE?

10 A. Yes. My concerns lay with specific aspects of the TIEC and Luminant testimony  
11 that advocate change to the existing method of transmission upgrade cost  
12 allocation (as a result of Southern Cross' proposed interconnection). Similarly, I  
13 am concerned with TIEC advocacy that suggests some form of direct attribution  
14 of ancillary services costs.

15 Further, the TCPA statement of position seems to echo TIEC, urging the  
16 Commission to consider changing the cost allocation regime for both transmission  
17 upgrades and ancillary services.

18 I am also concerned that NRG and TCPA appear to advocate the  
19 Commission take action that acts to protect specific competitors, rather than  
20 broadly protecting competition.

21 I will address each, in turn.

1                                    **IV.     TRANSMISSION COST ALLOCATION**

2    Q12.   PLEASE BRIEFLY DESCRIBE ERCOT TRANSMISSION PLANNING AND  
3            COST ALLOCATION.

4    A.     ERCOT has enjoyed the benefits of stable regulatory policy on transmission cost  
5            allocation issues since 1999.<sup>6</sup> ERCOT relies on the Regional Planning Group  
6            (RPG) to systematically (and regularly) assess both “reliability” and “economic”  
7            transmission projects. Though economic projects face a production cost savings  
8            test that isn’t present for proposed reliability projects, there are no differences in  
9            cost recovery by project type.

10           For all projects at 60kv or greater voltage, costs are incurred by load  
11           through so-called postage stamp rates.

12           Treating transmission upgrades as network elements (and thus recognizing  
13           diffuse general benefits for reliability) has resulted in a robustly reliable  
14           transmission network, capable of supporting a growing state population, and  
15           commensurate economic growth. Further, our system of cost allocation is  
16           straightforward, easy to administer, and elegant in its simplicity.

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<sup>6</sup> See PUCT Final Rule Adopted in Project No. 21080 on December 9, 1999, styled Term and Conditions for Transmission and Distribution Access, Inc. Including Tariffs and Modification of Existing Transmission Rules

1 Q13. PLEASE DESCRIBE WHY YOU BELIEVE CHANGES IN TRANSMISSION  
2 COST ALLOCATION METHODOLOGY WOULD BE MISPLACED.

3 A. There are a host of reasons why I advocate that the Commission leave  
4 transmission upgrade cost allocation policy unchanged. Summarily, my reasons  
5 include:

6 • **Existing Compensation.** Exporting Qualified Scheduling Entities  
7 (“QSEs”) are already subject to certain charges incurred by load serving  
8 entities, including ancillary services and ERCOT administrative fees. In  
9 addition, Subst. R 25.192(f) mandates that export charges be credited  
10 against Transmission Cost of Service rates, the overall costs that load pays  
11 toward transmission services in ERCOT. ERCOT load, including those  
12 consuming imported power, pay all of the typical non-bypassable charges.  
13 Existing policy in ERCOT is that load pays.

14 • **Avoiding “Balkanization”.** In some areas of the US, the complexity of  
15 cost allocation issues, within a region, but especially between regions,  
16 remains a point of significant controversy – and stakeholders spend  
17 significant resources arguing over the details. The result is that needed  
18 transmission projects are sometimes mired in stakeholder process  
19 arguments.<sup>7</sup> To attempt to parse the various costs and benefits of each  
20 network element, over time, as the system changes is an extraordinarily  
21 complicated exercise, and as a matter of policy should be approached with  
22 considerable caution. The result at various other venues has been a

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<sup>7</sup> See, for example, the ongoing controversy in PJM over the “Solution-based DFAX methodology.”

1           prescription for near endless argument over the nuance of cost and  
2           benefits. Our model to date has avoided that difficulty.

3           • **Regulatory Stability.** Current policy in ERCOT has resulted in significant  
4           investment in transmission with commensurate increased reliability across  
5           a broad ERCOT footprint. The network is statewide, and again, attempts  
6           to review discrete beneficiaries at the expense of the broader whole, is a  
7           significant departure from current policy. **See Exhibit FPH-2-R.**

8           • **System dynamism and commensurate attribution difficulty.** The  
9           ERCOT marketplace is extraordinarily dynamic. On a middle term basis -  
10          - significant resources enter, and exit the market. On a short term basis --  
11          hour by hour transmission topology, the flow of power, and transmission  
12          utilization changes. Note for example the original CREZ build-out.  
13          Though originally “intended” to allow wind to access load and the grid,  
14          that same network is being studied for Lubbock integration, utilized for  
15          integrating other generation resources, and has served to relieve congested  
16          elements serving oil and gas load. In the face of this dynamism,  
17          calculating the precise costs and benefits of a future potential resource is  
18          well nigh impossible.

19          • **Non-discrimination.** Although this CCN is obviously an available venue  
20          for parties to voice concerns about DC tie integration, in my opinion those  
21          concerns shouldn’t result in discriminatory treatment towards Southern  
22          Cross. Erecting anti-competitive barriers in this case could send an  
23          unwarranted message to potential competitors.

- 1           • **General benefits.** In my opinion, it is critically important to consider the  
2           potential benefits of Southern Cross as the Commission considers its list  
3           of conditions.<sup>8</sup> Examples of benefits include:
- 4                 ○ Bilateral system support agreements such as current agreements  
5                 with CFE and SPP;
  - 6                 ○ Increased efficiency that occurs with additional transmission  
7                 capacity;
  - 8                 ○ Reduction in operational risk provided by a resource of this type;
  - 9                 ○ Provision of an additional margin of safety/reliability benefits (for  
10                example, ERCOT reliability benefitted from DC tie imports during  
11                Energy Emergency Alerts in January 2014);
  - 12                ○ Assistance in economic dispatch by allowing access to broader  
13                sources of generation, as opposed to captive, less efficient  
14                generation;
  - 15                ○ Enhanced fuel diversity of the overall system; and,
  - 16                ○ Private party investment in a \$2 billion dollar asset.
- 17           • **Venue.** Finally, there are a variety of shortcomings associated with this  
18           CCN proceeding that do not lend themselves to deciding these highly  
19           nuanced issues. Abbreviated timeframes, complicated cost/benefit  
20           allocation questions, and limited stakeholder participation are significant  
21           obstacles to effective policy.

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<sup>8</sup> I note that the Brattle Group has raised significant questions in the context of the ERCOT Long-Term Study regarding whether ERCOT is capturing all of the benefits of transmission in its current planning process.

1 Q14. PLEASE SUMMARIZE YOUR PERSPECTIVE REGARDING  
2 TRANSMISSION COST ALLOCATION.

3 A. TIEC and Luminant propose a consequential shift from longstanding ERCOT  
4 policy. For the reasons stated above, such a shift would be undesirable in this  
5 context.

6  
7 **V. ANCILLARY SERVICES COST ALLOCATION**

8 Q15. PLEASE BRIEFLY DESCRIBE ERCOT ANCILLARY SERVICES AND COST  
9 RECOVERY ASSOCIATED WITH THOSE SERVICES.

10 A. ERCOT defines ancillary services as: “A service necessary to support the  
11 transmission of energy to loads while maintaining reliable operation of the  
12 Transmission Service Provider’s (TSP’s) transmission system using Good Utility  
13 Practice.”<sup>9</sup> Generally, in today’s world, we refer to regulation, responsive and  
14 non-spinning reserves when we are referring to ancillary services.

15 These services are deployed to meet both NERC operating standards and,  
16 commensurately, reliable electric service. The current suite of services has been  
17 largely in place since market opening and, coupled with the nodal market design,  
18 has proven remarkably resilient in the face of unique levels of wind penetration.

19 For example, ERCOT has reported that rolling 12-month average Control  
20 Performance Standard 1 (a measure of ERCOT’s ability to maintain steady-state

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<sup>9</sup> See the ERCOT glossary at <http://www.ercot.com/glossary>.

1 frequency within defined limits) has been trending favorably since 2008, even  
2 with significant additions of wind on the ERCOT system.<sup>10</sup>

3 Reasoning that ancillary services procurement functions to ensure a  
4 reliable system, we have generally uplifted the costs based on load ratio share.

5  
6 Q16. DOES ERCOT HAVE PROCESSES FOR REVIEWING ANCILLARY  
7 SERVICES AND ASSOCIATED ISSUES OF COST ALLOCATION?

8 A. Yes. ERCOT proposed a “Future Ancillary Services” regime in September, 2013  
9 in its Concept Paper on Ancillary Services. Under ERCOT protocol 3.16, there is  
10 also an annual review of the amount of reserves procured.

11 In addition there have been several ERCOT task forces and committees  
12 over the years that have reviewed cost allocation as it relates to ancillary services,  
13 including the 2009 Wholesale Market Subcommittee Cost Allocation Task Force  
14 and the 2010 Wind Cost Allocation Task Force.

15 The issues have proven contentious and difficult for the stakeholder  
16 community at large to resolve.<sup>11</sup> These issues are complicated, and have a range  
17 of potentially significant effects on a variety of stakeholders.

18 As to cost allocation, while I understand that certain stakeholders might  
19 have opinions that are adverse to Southern Cross’ interests within this proceeding,  
20 in my opinion, it is an inopportune venue for the robustness of exchange (and  
21 frankly, considered care) that these issues merits.

---

<sup>10</sup> See, for example, ERCOT Monthly Operational Overview (September 2015) at Slide 6.

<sup>11</sup> See, for example March 16, 2010 TAC Report to the ERCOT Board of Directors.



1 Q17. IF SOUTHERN CROSS IS FOUND TO BE THE MOST SEVERE SINGLE  
2 CONTINGENCY (MSSC), SHOULD THE COSTS OF ANY RESULTING  
3 INCREASES TO ANCILLARY SERVICE PROCUREMENT BE PAID BY  
4 SOUTHERN CROSS?

5 A. I agree with the Luminant witness on this matter. Thus far, we've foregone policy  
6 that attempts to allocate the cost of ancillary services based on a cost-causation  
7 methodology. I will echo Ms. Frazier's admonition, that to do so would be a  
8 major departure from ERCOT's current practice. In addition, it may well turn out  
9 that a detailed analysis of the load ratio share of payments made by both exporting  
10 QSEs and load consuming imported power more than offsets any additional  
11 procurement costs.

12  
13 Q18. ARE THERE OTHER REASONS TO AVOID DIRECT ASSIGNMENT OF  
14 ANCILLARY SERVICES COSTS TO A SPECIFIC RESOURCE IN THIS  
15 PROCEEDING?

16 A. In my opinion, yes. For the following reasons:

- 17 • Ancillary services tend to be a relatively small portion of the overall cost  
18 of energy.<sup>12</sup>
- 19 • Placing an obligation for ancillary services on particular resources may not  
20 adequately account for the benefits the same resource provides (which I  
21 believe to be substantial in Southern Cross' case).

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<sup>12</sup> See, for example, 2014 ERCOT State of the Market Report, Issued July, 2015 at Introduction, Page iii.

- 1           • Ancillary services are currently in a state of some flux, with active  
2           protocol consideration of ERCOT's proposed Future Ancillary Service  
3           currently working through the stakeholder process.
- 4           • Ancillary services provide general benefit to load, and are a necessity for  
5           system reliability, and therefore their costs seem appropriately borne by all  
6           load.
- 7           • The appropriate venue for this discussion would seem to be the ERCOT  
8           stakeholder or PUCT rulemaking process, not a CCN proceeding.
- 9           • I also re-urge my prior arguments regarding balkanization, regulatory  
10          stability, attribution difficulty, non-discrimination, and venue as applied in  
11          the prior context of transmission cost allocation to this issue of ancillary  
12          services cost allocation.

## 14           **VI.     RESOURCE ADEQUACY AND COMPETITION**

15   Q19. PLEASE COMMENT BRIEFLY ON THE STATEMENTS OF POSITION  
16       FILED BY NRG AND TEXAS COMPETITIVE POWER ADVOCATES?

17   A.   In the main, my sense is that the positions filed by TCPA and NRG are reflective  
18       of the fact that ultimately, both interests may find themselves competing with  
19       generation that wishes to import utilizing the Southern Cross DC-tie. I expect  
20       competitive interests to utilize available venues to actively inhibit potential  
21       competitors, but I don't view this as a beneficial use of the Commission or  
22       ERCOT process given their competitively neutral role.

1           Of course, TCPA discusses as a first principle, that the Commission  
2           should “do no harm.” I tend to agree, and for the reasons I’ve stated above  
3           advocate against the development of cost allocation regimes that would tend to  
4           discriminate against a potential market participant or create anti-competitive  
5           outcomes.

6           Further, Competitive Power Advocates exhorts the Commission to take  
7           into consideration “how new large DC ties may interact with the resource  
8           adequacy mechanisms currently in place in the competitive, energy-only ERCOT  
9           market.” Likewise NRG urges the Commission to “adopt...market rules to  
10          protect the integrity of the ERCOT market pricing mechanisms and long-term  
11          resource adequacy.”

12          On these issues, the Commission and stakeholders have proven  
13          remarkably capable of adapting to circumstance. Increased wholesale market  
14          offer caps (to the current \$9000.00/MWh), adoption of the Operating Reserve  
15          Demand Curve (creates a price adder to reflect the value of available reserves in  
16          real-time), and other tweaks to the market design have influenced cost recovery  
17          for ERCOT generation resources. Most recently, the Commission has indicated  
18          its continued interest in potential additional changes to enhance the effectiveness  
19          of these adders.

20          These continued evolutions influence my perspective that the Commission  
21          will have ample future opportunity to act in a competitively neutral fashion to  
22          appropriately provide incentives for new asset development.

In the near term, there is no hint of a reliability concern, and in my opinion it would be premature for the Commission to act without significantly more data about the grid, its topology, the level of expected import and export, and a host of other circumstances at the time that they unfold.

## VII. CONCLUSION

**Q20. PLEASE SUMMARIZE YOUR CONCLUSIONS.**

A. Since 1999, Texas stable regulatory regime has resulted in extraordinary investment. This investment has resulted in a reliable network, competitive outcomes, and customer choice. In addition, the model has proved attractive enough that a private party is considering the addition of a \$2 billion dollar asset to the ERCOT system, without the benefit of regulated cost recovery.

Although there are those that might utilize this contested proceeding as an available venue to shed certain costs or erect barriers to competitive entry, this is not the appropriate forum to address either complicated technical issues or changes to cost allocation. To address those issues here, without the broadest possible participation of ERCOT stakeholders and commensurate depth of inquiry, is to invite unintended consequences.

For the reasons stated above, I urge the Commission to proceed cautiously in developing its list of reasonable conditions.

Q21. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

## **Exhibit FPH-1-R. Biography**

For almost two decades, Paul Hudson has been an active participant in, and observer of, the extraordinarily profound transition of the Texas and US power sector.

Paul currently works with a variety of energy-related interests, providing strategic guidance to power industry stakeholders with interests in ERCOT and utility regulation, primarily in Texas.

Prior to entering the private sector in 2008, Paul spent almost a decade as a state energy and telecommunications regulator – including 5 years as an appointee of the Governor – serving as Commissioner and Chair of the three-member Texas Public Utility Commission.

Paul also served sequentially in a variety of other policy roles including Director of Policy and Deputy Director of Policy to the Governor of Texas, Advisor to Commissioner Brett Perlman of the Commission, and as a member of the Commission policy development staff under former Commission Chair Pat Wood.

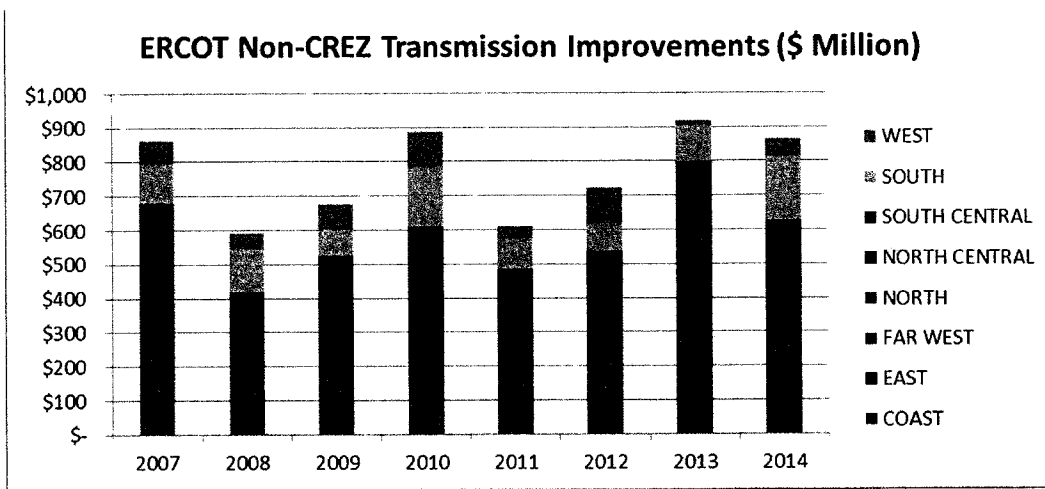
In 2012, Paul was appointed by Secretary Chu to serve a two-year term on the Department of Energy's Energy Advisory Committee. He was subsequently re-appointed by Secretary Moniz to serve out a term completed in 2015.

He has previously served on the Board of Directors of ERCOT, the FERC/NARUC Collaborative on Demand Response, State Policy Advisor to Advanced Energy Economy, and the Western Governor's Association Working Group on Cross Border Energy Issues.

Paul also served as an independent director to privately held CLEAResult. During his tenure with the CLEAResult board, the company transitioned through a private equity round with Boston-based General Catalyst, to its current equity partner General Atlantic. During his tenure with CLEAResult, the company consummated 7 acquisitions and grew from approximately \$35 million to \$250 million in revenue.

Hudson also previously chaired the Board of the Center for the Commercialization of Electric Technologies, a broad-based 25-member organization committed to advancing energy technology ([www.electrictechologycenter.com](http://www.electrictechologycenter.com)) and on the Advisory Board to Gridnet, a SmartGrid Platform provider.

**Exhibit FPH-2-R. ERCOT Non-CREZ Transmission Improvements by Zone**



Source: ERCOT Report on Existing and Potential Constraints and Needs, December 2015

### Exhibit FPH-3-R. References

- a. Title II, Texas Utilities Code – Public Utility Regulatory Act
- b. PUCT Substantive Rules
- c. PUCT Procedural Rules
- d. ERCOT Protocols
- e. PUC Docket No. 45624 Documents and Filings
- f. PUC Docket No. 42647 Documents and Filings
- g. PUC Docket No. 45124 Documents and Filings
- h. ERCOT Glossary at <http://www.ercot.com/glossary>.
- i. Report to the ERCOT BOD, December 8, 2015 by Bill Blevins. 2016 Methodology for Determining Minimum Ancillary Service Requirements.
- j. Report on the Capacity, Demand and Reserves (CDR) in the ERCOT Region, 2017-2026 May 3, 2016.
- k. 2014 ERCOT State of the Market Report, Issued July, 2015 at Introduction, Page iii.
- l. ERCOT Monthly Operational Overview (September 2015) at Slide 6.
- m. March 16, 2010 TAC Report to the ERCOT Board of Directors.
- n. ERCOT Report on Existing and Potential Constraints and Needs, December 2015
- o. *See, for example, the ongoing controversy in PJM over the “Solution-based DFAX methodology.” – See FERC Order from November 24<sup>th</sup>, 2015 which accepted and suspended proposed amendments to PJM Interconnection L.L.C.’s (“PJM”) Open Access Transmission Tariff (“OATT”) that allocated cost responsibility for two transmission upgrades: the Bergen-Linden Corridor Project, and the Artificial Island Project.*
- p. *See also, Parties Square Off at FERC Session on PJM Coast Allocation, Transmission Hub article by Tom Tiernan, January 13, 2016. Article available here: <http://www.transmissionhub.com/articles/2016/01/parties-square-off-at-ferc-session-on-pjm-cost-allocation.html>*
- q. PUCT Final Rule Adopted in Project No. 21080 on December 9, 1999, styled Term and Conditions for Transmission and Distribution Access, Inc. Including Tariffs and Modification of Existing Transmission Rules.
- r. Presentation of ERCOT CEO Bill Magness at the ERCOT Market Summit, March 1<sup>st</sup>, 2016.
- s. ERCOT GIS Report, April 2016.
- t. ERCOT State of the Grid Report 2015.